general population studies, a disease can nevertheless be found to be tied in some way to the HLA complex. As the HLA story continues to unfold, we will learn more about these important antigens in ophthalmology.

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Automated Perimetry

AUTOMATED PERIMETRY, like computerized axial tomography (CAT scan), is one of the exciting newer developments from the computer age. Ophthalmologists for years have purchased numerous perimetric devices in an attempt to more efficiently evaluate visual field defects. Since 1975 we have had the opportunity at the University of California, Davis to help design and evaluate several of these automated perimeters. Our initial skepticism about automated perimetry has been replaced by genuine optimism. We are inclined to agree with Fankhauser and associates and Heijl and co-workers who found automated screening superior to conventional kinetic perimetry.

The ideal automated perimeter should offer several advantages over manual techniques and include the following features: (1) precise detection and assessment of visual field defects of all types with a negligible false alarm rate, (2) accurate monitoring of progressive visual field loss, (3) standardization of stimulus conditions in test procedures, (4) electronic monitoring of eye movement, (5) reduction in examination time, (6) administration of testing procedures by persons with minimal or no perimetric training and (7) reasonable purchase price.

Unfortunately, physicians have been inundated by a variety of first generation automated perimeters. Because decisions about treatment modalities are frequently based on perimetric data, we feel it is mandatory that these perimeters be validated by controlled clinical studies to assess whether they fulfill the criteria for an ideal automated perimeter. Without such controlled published data, a physician will not be able to make an intelligent decision as to which automated perimeter is appropriate for his or her practice. This is no small decision because automated perimeters can range in price from $4,000 to $100,000.

Most automated perimeters use a static or suprathreshold static program. Some devices have kinetic programs but the versatility of static programs is becoming evident. Goldmann kinetic perimetry is the well established standard. However, it is likely that when physicians become familiar with static testing, the advantages of static and suprathreshold static perimetry may well replace kinetic programs.

In summary, the usefulness of automated perimetry is a reality. When automated perimeters are properly used and their findings validated by controlled studies, they can be excellent detectors of visual field defects. The assessment of visual field defects is somewhat limited, however, by the automated perimeters available at present. Nonetheless, as newer generations of automated perimeters are developed, it actually may be possible to see a computerized three-dimensional view of the island of vision with scotomas scooped out of the island. In the future, there may be nothing about visual fields left to the imagination.

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Lasers in Ophthalmology

HISTORICALLY, ruby lasers were the first lasers used clinically in ophthalmology. A ruby laser utilizes the photostimulation of a ruby crystal to produce coherent red light. More recently, argon lasers have gained general acceptance over other visible spectrum laser systems. This type of laser utilizes electrical stimulation or argon gas to produce a coherent green beam that is dependent on pigment (or blood) for absorption of energy. Most energy absorption occurs in the pigment epithelial layer of the retina. Either of these lasers can be used to surround a retinal tear to prophylactically prevent retinal detachment. The laser energy then forms a scar that effectively seals this tear. Laser photocoagulation cannot be used when significant fluid has accumulated between the sensory retina and pigment epithelium causing a frank rhegmatogenous (tear-induced) retinal detachment.

Ruby or argon laser retinal photocoagulation has now been proved to help in the control of proliferative diabetic retinopathy. The laser energy is used to treat specific areas of neovascularization as well as to reduce the overall metabolic needs of the retina in the form of panretinal ablative photocoagulation. Uses in photocoagulation of vascular tumors, central serous chorioretinopathy, sickle cell retinopathy, Coats disease and other proliferative retinopathies are other common applications of these laser systems. Although the ruby and argon laser systems have been used for treatment of macular degenerative disease and for some inflammatory diseases in the macular region, the results have been discouraging. Iridotomy by laser is another accepted anterior segment application of this form of energy.

Xenon arc photocoagulation, which was the first generally available method of retinal photocoagulation, is still used extensively but is technically not a laser and will not be considered here.

Diabetic maculopathy, a common cause of visual impairment in cases of diabetes mellitus, is undergoing a five-year national cooperative randomized study and the overall benefit of laser photocoagulation in this condition has not been determined. Panretinal photocoagulation also has recently been shown advantageous in the control of rubeosis iridis.

The adaptation of a carbon dioxide laser for intraocular use has been recently reported. This offers a unique method of cauterizing or cutting with infrared energy inside the eye at the time of vitrectomy. Some of the indications for the use of transvitreal carbon dioxide laser photocautery at the time of vitrectomy would appear to be retinal tears discovered at or induced by vitrectomy, fibrovascular fronds overlying the optic nerve or elsewhere that are actively bleeding, and rubeosis iridis that is actively bleeding and cannot be controlled. Clinical trials are currently in progress.

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Acute Angle-Closure Glaucoma

IN THE CLOSED angle type of glaucoma, the peripheral iris blocks the drainage system (trabecular meshwork) at the angle of the anterior chamber. Although angle-closure may be secondary to other ocular diseases, such as iritis, pupillary block is the most common cause. In this condition, the normal flow of aqueous humor through the pupil is partially blocked, causing the peripheral iris to billow forward, to contact the trabecular meshwork and thereby prevent aqueous drainage from the eye.

The process may be triggered in susceptible persons by pupillary dilation (either physiologic or pharmacologic), the prone position or, paradoxically, strong miotics. The blockage of the trabecular meshwork may occur suddenly or slowly, producing two different clinical features: acute or chronic angle-closure glaucoma. Intermittent (subacute) presentations also occur. When blockage occurs suddenly, the intraocular pressure rises rapidly and to high levels, causing pain in the trigeminal distribution with associated corneal edema. The latter results in blurred vision and colored halos around lights. Reflex vagal stimuation may lead to nausea, vomiting and even abdominal pain. Irreversible and severe optic nerve damage may occur within a few hours. The patient may describe previous episodes that spontaneously subsided.

Findings include conjunctival hyperemia, distorted corneal light reflex, shallow anterior chamber, fixed, middilated pupils and elevated intraocular pressure. Confirmation is by gonioscopy. Between attacks the intraocular pressure may be normal. When the diagnosis is in doubt, some